CLAIMS

1. Method for equalising and demodulating a data signal transmitted via a time-variant channel to a receiver,
characterised in that
the scatterer coefficients (attenuation, delay and Doppler frequency) in the received data signal, which cause signal distortion in the channel, are measured in the receiver, and that the data signal is equalised and then demodulated with them.

2. Method according to claim 1
characterised in that
the measurement of the scatterer coefficients and the equalisation of the data signal takes place within the time domain.

3. Method according to claim 2,
characterised by
its use in the context of single-carrier data transmission schemes.

4. Method according to claim 2,
characterised by
its use in the context of multi-carrier data transmission procedures for receiving known data sequences (training or synchronisation sequences).

5. Method according to claim 1,
characterised in that

the measurement of the scatterer coefficients and the equalisation of the data signal take place within the frequency domain.

6. Method according to claim 5,
characterised by
its use in the context of multi-carrier data transmission procedures.

7. Method according to any one of the preceding claims
characterised in that
the scatterer coefficients are measured via a maximum likelihood criterion.

8. Method according to claim 7,
characterised in that
the maximum-likelihood criterion is determined from the Euclidian distance between the received signal, the scatterer coefficients and the signal data demodulated in the receiver.

9. Method according to any one of the preceding claims,
characterised in that
a first measurement of the scatterer coefficients is implemented with the assistance of a known data sequence (training or synchronisation sequence).

10. Method according to claim 1 to 9,
characterised in that
the first measurement of the scatterer coefficients is implemented block-wise over an entire data sequence.

11. Method according to any one of the preceding claims 1 to 9,
characterised in that
a Kalman algorithm is used iteratively for the measurement of the scatterer coefficients.

12. Method according to any one of the preceding claims 1 to 9,
characterised in that
a recursive-least-square algorithm is used iteratively for the measurement of the scatterer coefficient.

13. Method according to claim 9 or 10,
characterised in that
the scatterer coefficients determined in the first measurement are used for receiving the associated user data, wherein the data are equalised and demodulated block-wise over an entire data sequence, and that the scatterer coefficients measured in the first measurement are corrected with reference to the data equalised and demodulated in this block-wise manner.

14. Method according to any one of the preceding claims,
characterised in that
the scatterer coefficients determined in the first measurement are used for receiving the associated user data, wherein the scatterer coefficients determined in the first measurement are corrected according to a Kalman or recursive-least-square algorithm with reference to the data equalised and demodulated.

15. Method according to claim 13 or 14,
characterised in that
a tree-search procedure is used for correction of the scatterer coefficients and for data demodulation, wherein, the scatterer coefficients and metrics are determined, in each case, for all possible data sequences, and those data sequences, which provide the best maximum-likelihood-metric, are then selected from the tree structure.

16. Method according to claim 15,
characterised in that
the scatterer coefficients corresponding to the selected best data sequences are used for subsequent equalisation and demodulation.

17. Method according to claim 15 or 16,
characterised in that
selection of the data sequences is carried out block-wise for the entire data sequence observed.

18. Method according to claim 15 to 16,
characterised in that,
the data sequences are selected after a predetermined pathway depth of the tree has been reached.

19. Method according to claim 15 to 18,
characterised in that
a metric-first algorithm is used in the tree-search procedure.

20. Method according to claim 15 to 18,

characterised in that,
a breadth-first algorithm is used in the tree-search procedure.

21. Method according to claim 15 to 18,
characterised in that
a depth-first algorithm is used in the tree-search procedure.

22. Method according to claim 15 to 21,
characterised in that
the pathway depth and/or the number of pathways is varied adaptively in the tree-search procedure according to the scatterer coefficients determined.

23. Method according to any one of claims 15 to 22,
characterised in that
the metric value is also presented in the output of the demodulated data sequence.

24. Method according to claim 15 to 22,
characterised in that
in addition to the data sequence with the best maximum-likelihood metric, other, next-best data sequences with a next-best-likelihood metric are also presented.

25. Method according to any one of claims 15 to 24,
characterised in that
when receiving data signals coded according to a code, exclusively data sequences corresponding to valid code words are included in the tree-search procedure.

26. Method according to claim 25,
characterised in that
in addition to taking the code into consideration, a Viterbi algorithm or APP algorithm is used in the tree-search procedure.

27. Method according to any one of the preceding claims
characterised in that
the first measurement of scatterer coefficients is implemented exclusively with unknown useful data sequences, and that default values are used in the initialisation of the algorithm instead of the training and synchronisation sequences.

28. Method according to any one of claims 7 to 10,
characterised in that
the maximum number of scatterer coefficients to be included in the algorithms is adapted in each case on the basis of the scatterer coefficients previously determined.